

# TEACHERS' RETIREMENT SYSTEM OF THE STATE OF ILLINOIS

## Discussion of Valuation Results

*Actuarial Valuation as of June 30, 2016*

*Kim Nicholl, FSA, MAAA, FCA, EA*

*Matt Strom, FSA, MAAA, EA*

*Jake Libauskas, ASA, MAAA, EA*

*October 28, 2016*

*This document has been prepared by Segal Consulting for the benefit of the Board of Trustees of the Teachers' Retirement System of the State of Illinois and is not complete without the presentation provided at the October 28, 2016 meeting of the Board of Trustees. This document should not be shared, copied or quoted, in whole or in part, without the consent of Segal Consulting, except to the extent otherwise required by law. Except where otherwise specifically noted, the actuarial calculations and projections were completed under the supervision of Matthew A. Strom, FSA, MAAA, Enrolled Actuary.*

# Discussion Topics

---



**Segal**

- **Overview of Valuation Process**
- **Summary of Valuation Highlights**
- **Membership and Demographics**
- **Valuation Results**
- **Solvency Projections**

# Purposes of the Actuarial Valuation

---

- Report the System's actuarial assets
- Calculate the System's liabilities
- Determine the funding progress
- Calculate the Actuarially Determined Contribution
  - Actuarial Math 2.0
- Determine the contribution under the Statutory Funding Plan
- Explore reasons why the current valuation differs from prior valuations
- Provide information for annual financial statements

# The Valuation Process

---

## Input

Member Data  
Asset Information  
Benefit Provisions  
Actuarial Assumptions  
Funding Methodology



## Results

Actuarial Value of Assets  
Normal Cost and Actuarial Liability  
Unfunded Liability and Funded Ratio  
Statutory Contribution  
Actuarially Determined Employer Contribution  
Accounting Results

# How is an Actuarial Valuation Performed?

---

- Gather data
  - Participant data as of the prior valuation date
  - Financial data as of the valuation date
- Project a benefit for each member, for each possible benefit
- Utilize actuarial assumptions
  - Economic (investment return, inflation, salary raises)
  - Demographic (death, disability, retirement, turnover)
- Apply assumptions to benefits to determine a total liability and assign liabilities to service
- Apply the Board's funding policy to determine Actuarially Determined Contribution (Actuarial Math 2.0)
- Project assets and liabilities to 2045 and determine the Statutory Contribution as a level percentage of payroll necessary to achieve 90% funded ratio by June 30, 2045
  - Mandated by the Illinois Pension Code

# Actuarial Assumptions

## Two types:

### Demographic

- Retirement
- Disability
- Death in active service
- Withdrawal
- Death after retirement

### Economic

- Inflation – 2.50%
- Interest rate – 7.00%, net of investment expenses
- Salary increases – 9.25% for members with one year of service to 3.25% for members with 20 or more years of service
- Payroll growth – based on open group projection with a level active population and new entrants similar to newly hired employees

Economic assumptions are subject to an annual review and were modified for the June 30, 2016 actuarial valuation.

# Actuarial Methods

Asset Valuation Method (Actuarial Assets)	Cost Method	Amortization Method
<ul style="list-style-type: none"><li>➤ Investment gains and losses recognized over a number of years<ul style="list-style-type: none"><li>▪ TRS uses a five-year smoothing period</li></ul></li></ul>	<ul style="list-style-type: none"><li>➤ Allocation of liability to past and future service</li><li>➤ Projected unit credit required for Statutory Contribution<ul style="list-style-type: none"><li>▪ Current year's cost based on value of benefit earned that year, using projected salary</li><li>▪ Results in back loading of normal cost</li></ul></li><li>➤ Entry age normal used for Actuarial Math 2.0<ul style="list-style-type: none"><li>▪ Allocates cost of member's benefit over expected career as a level % of salary</li><li>▪ Most common cost method among public sector retirement systems</li><li>▪ Required by GASB</li></ul></li></ul>	<ul style="list-style-type: none"><li>➤ Statutory Contribution<ul style="list-style-type: none"><li>▪ No explicit method to amortize the UAAL; the total contribution less the normal cost is the payment toward the UAAL</li></ul></li><li>➤ Actuarial Math 2.0<ul style="list-style-type: none"><li>▪ Layered amortization with new UAAL amortized over 20 years</li><li>▪ Amortization payments increase at the rate of future State revenue growth, assumed to be 2%</li></ul></li></ul>

# Actuarially Determined Contribution vs. Statutory Contribution

## Actuarially Determined Contribution (Actuarial Math 2.0)

- Equal to the normal cost plus amortization of the unfunded actuarial accrued liability (UAAL)
- Benefits:
  - Entry age normal cost method
  - 100% funding target
  - Reflects appropriate tier of benefits of those in TRS, not those to be hired

## Statutory Contribution under Illinois Funding Policy

- Equal to amount determined as a level percentage of payroll necessary to achieve a projected funded percentage of 90% by 2045
- Shortcomings:
  - Projected unit credit cost method
  - 90% funding target
  - Reflects effect of Tier II provisions for members who have not yet been hired

The Actuarially Determined Contribution is compared to the Statutory Contribution as measure of the inadequacy of the Statutory Contribution.



# Summary of Valuation Highlights

---

- Valuation reflects several changes to economic assumptions
  - Inflation lowered from 3.00% to 2.50%
  - Investment return lowered from 7.50% to 7.00%
  - Salary scale lowered by 0.50%
  - Tier II COLA and pay cap increase assumptions lowered from 1.40% to 1.25%
- Market value of assets returned -0.1% for year ending 6/30/16 (Segal calculation)
  - Gradual recognition of deferred gains and losses resulted in +6.5% return on actuarial assets
  - Loss on actuarial value of assets of \$467 million
- Demographic and liability experience resulted in a loss of \$964 million
- Funded ratio based on the actuarial value of assets decreased from 42.0% in 2015 to 39.8% in 2016 (41.8% prior to assumption changes)
- Required State contribution for fiscal 2018 is \$4.56 billion, up from \$3.99 billion for fiscal 2017
- The Fiscal 2018 State contribution under Actuarial Math 2.0 is \$6.88 billion
  - Statutory contribution is \$2.32 billion less than Board funding policy amount

# Membership

## Active membership statistics

	June 30, 2016	June 30, 2015	Change
Number			
Tier I	133,498	138,700	-3.8%
Tier II	<u>26,186</u>	<u>21,136</u>	+23.9%
Total	159,684	159,836	-0.0%
 Average Salary (full-time/regular part-time)	 \$69,576	 \$68,581	 +1.5%
 Average Age	 42.1 years	 41.4 years	
 Average Total Service	 11.0 years	 10.8 years	

Member data used in the valuation is as of the prior valuation date.

# Membership

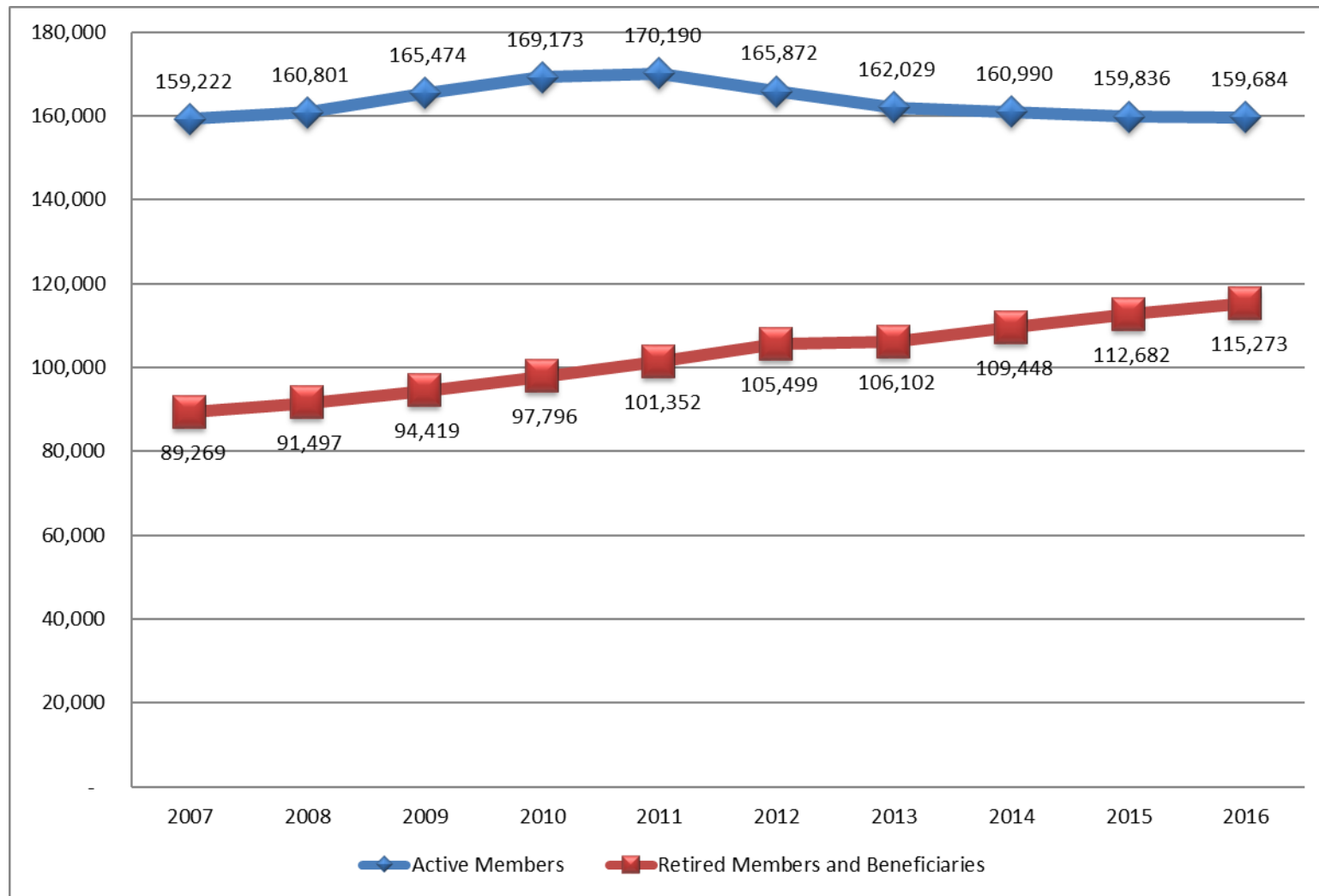
---

## Retiree and beneficiary statistics

	June 30, 2016	June 30, 2015	Change
Number	115,273	112,682	+2.3%
Annual Annuities	\$5.728 billion	\$5.505 billion	+4.0%
Average Age	71.5 years	70.6 years	
Average Monthly Benefit	\$4,141	\$4,072	+1.7%

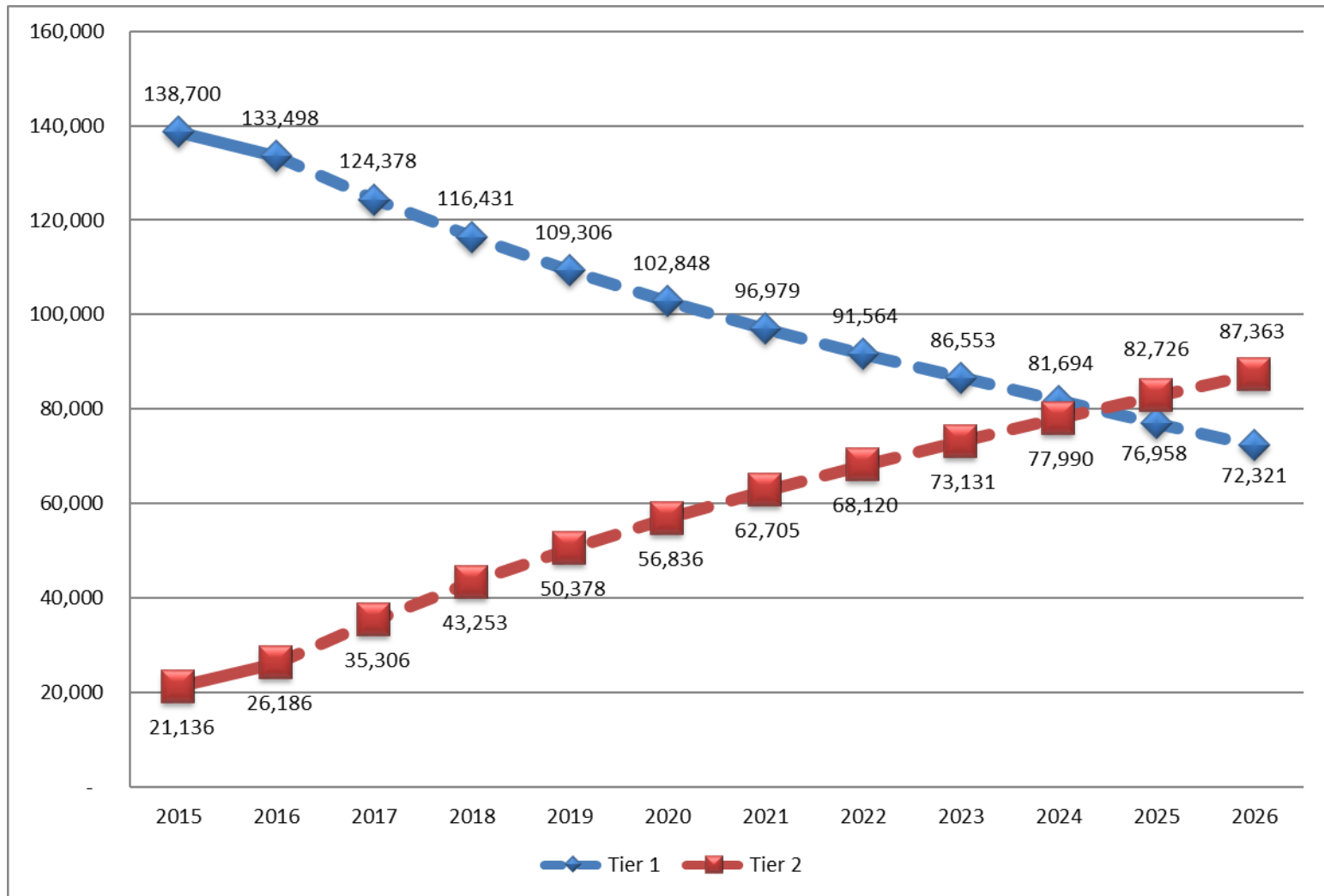
Member data used in the valuation is as of the prior valuation date.

# Active and Retired Membership



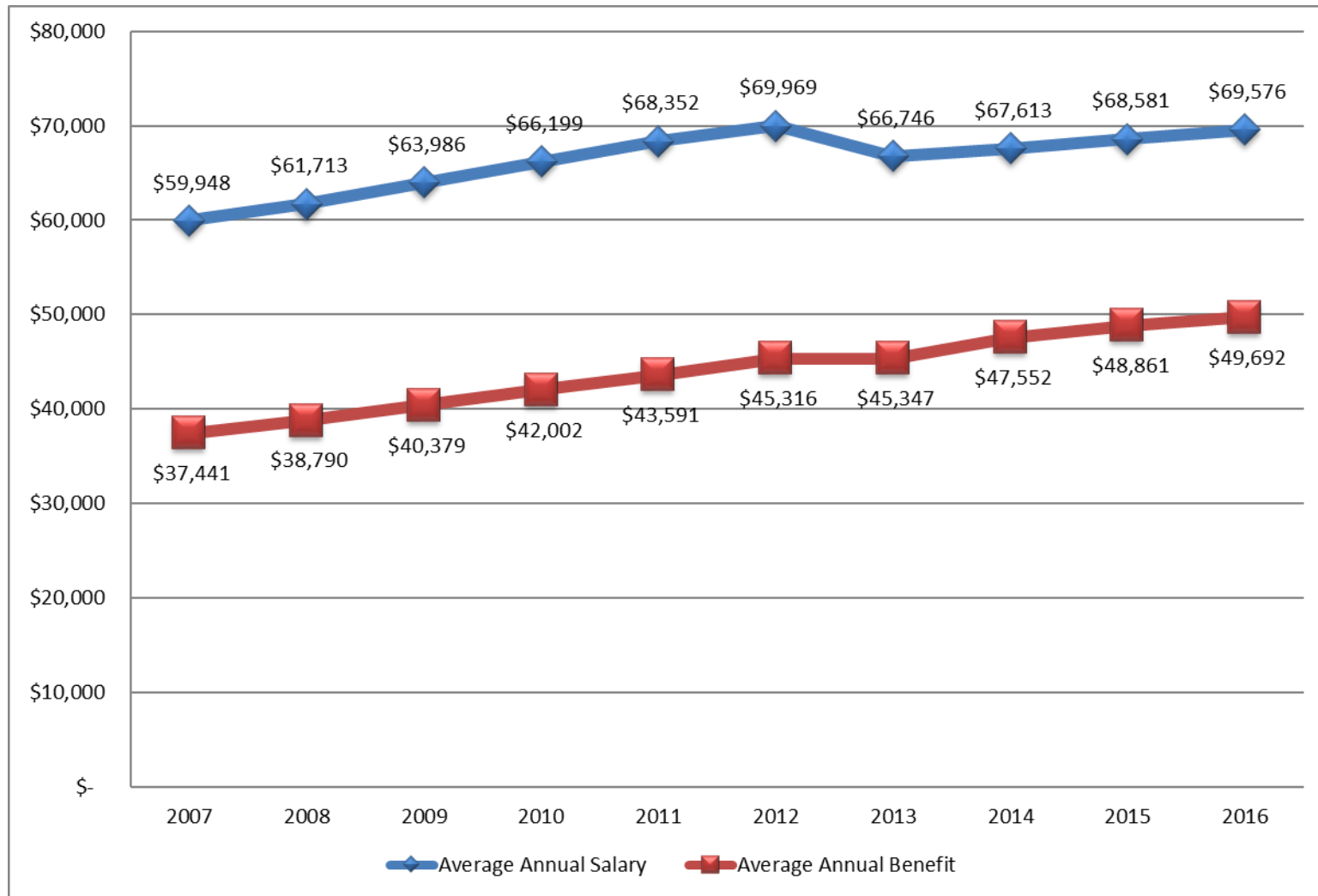
Active member and annuitant data used in the valuation is as of the prior valuation date. Prior to 2013, annuitant data used in the valuation was as of the valuation date.

# Projection of Active Membership by Tier



Active member data used in the valuation is as of the prior valuation date.  
Dashed lines represent a projection of membership.

# Average Salary and Average Benefit



Since 2006, average salary for full-time and regular part-time employees has increased, on average, 1.7% per year. The average annual benefit has increased by 3.6% per year.

# Assets

---

- The market value of assets decreased from \$46.4 billion (as of June 30, 2015) to \$45.3 billion (as of June 30, 2016)
  - Segal determined the investment return was -0.1%, net of investment expenses
- The actuarial value of assets – which smoothes investment gains and losses over five years – increased from \$45.4 billion (as of June 30, 2015) to \$47.2 billion (as of June 30, 2016)
  - Return of 6.5%, net of investment expenses
  - Actuarial value is 104.4% of market
  - There is a total of \$2.0 billion of deferred investment losses that will be recognized in future years
- The average annual return on market assets:
  - Past 10 years is 5.3%
  - Past 15 years is 6.2%
  - Past 20 years is 7.1%
- The average annual return on actuarial assets:
  - Past 10 years is 5.6%
  - Past 15 years is 6.4%
  - Past 20 years is 7.3%

# Assets

## Market Value of Assets (in millions)

	June 30, 2016	June 30, 2015
Beginning of Year	\$46,407	\$45,824
Contributions		
➤ State	\$3,742	\$3,378
➤ Employers	148	146
➤ Members	<u>952</u>	<u>935</u>
➤ Total	\$4,842	\$4,459
Benefits Paid	(5,931)	(5,625)
Administrative Expenses	(23)	(22)
Investment Income (net)	<u>(44)</u>	<u>1,771</u>
End of Year	\$45,251	\$46,407
Rate of Return	-0.10%	3.91%



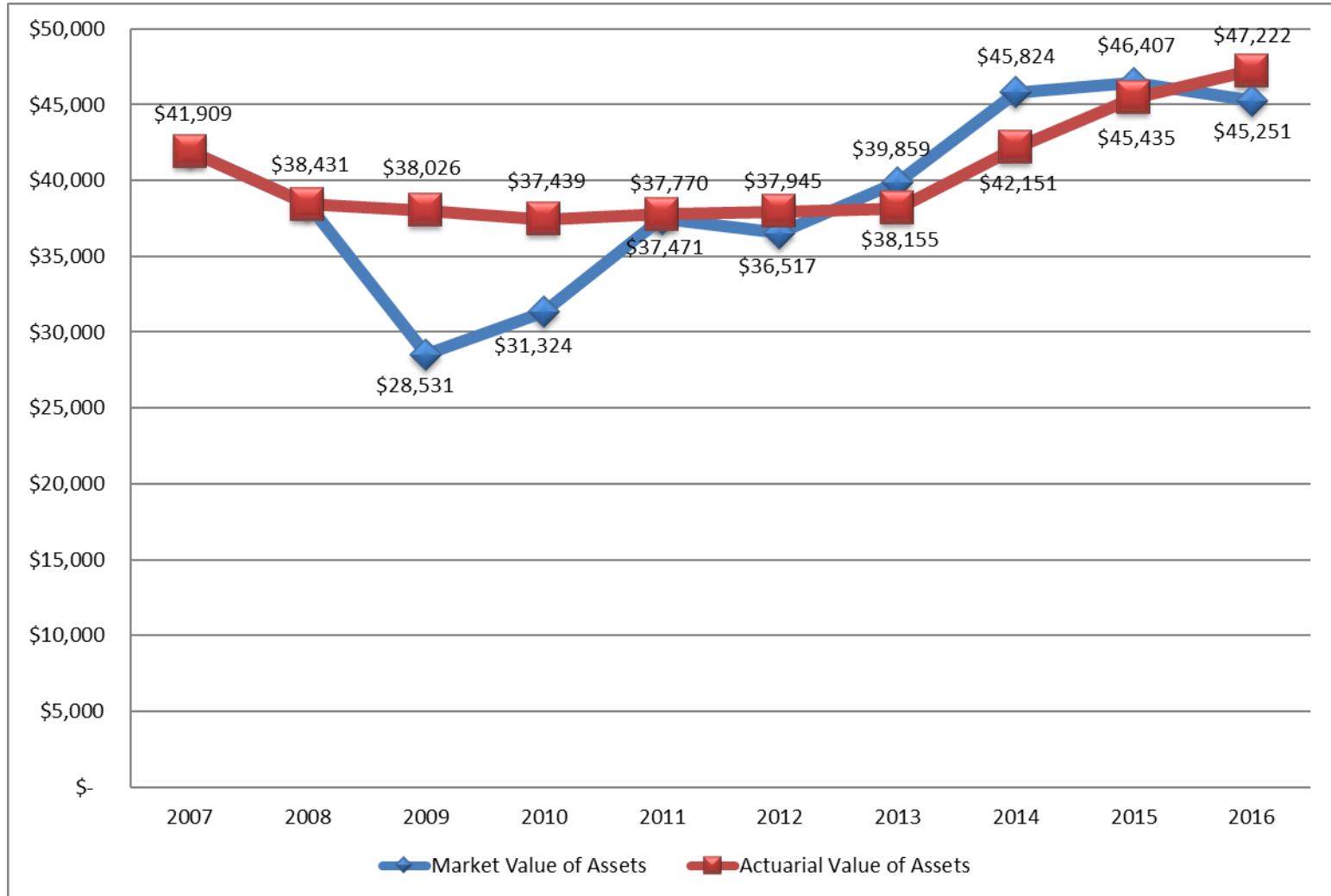
# Assets

## Actuarial Value of Pension Assets (in millions)

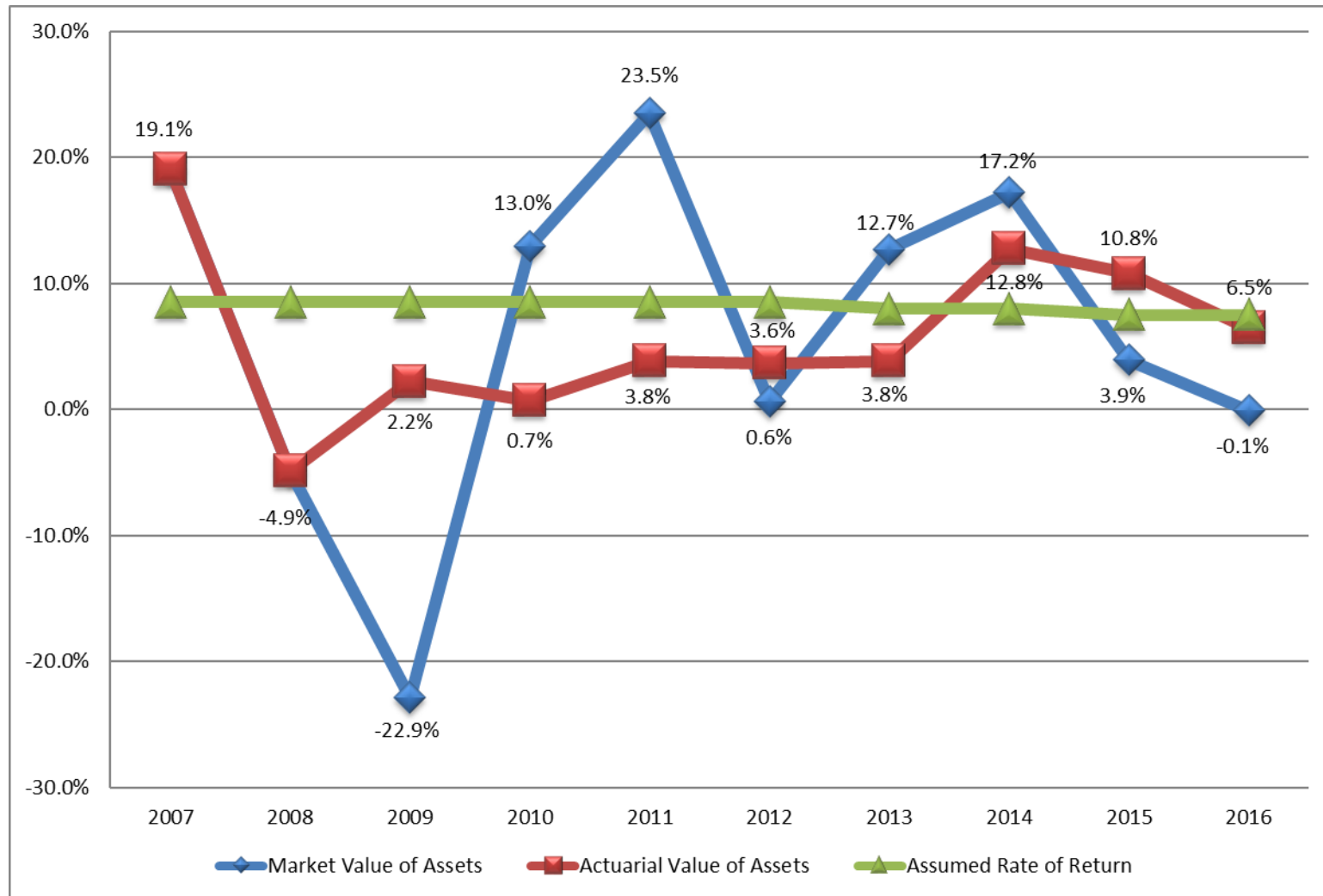
Market Value of Pension Assets as of June 30, 2016			\$45,251
Gain or (Loss) on Assets	Original Amount	% Deferred	Deferred Amount
Year ended June 30, 2016	(\$3,483)	80%	(\$2,786)
Year ended June 30, 2015	(1,622)	60%	(973)
Year ended June 30, 2014	3,626	40%	1,450
Year ended June 30, 2013	1,689	20%	338
Year ended June 30, 2012	(2,911)	0%	<u>0</u>
Total			(\$1,971)
Actuarial Value as of June 30, 2016			\$47,222
Actuarial Value as a Percent of Market Value			104.4%
Rate of Return			6.46%

# Market and Actuarial Values of Assets

\$ Millions

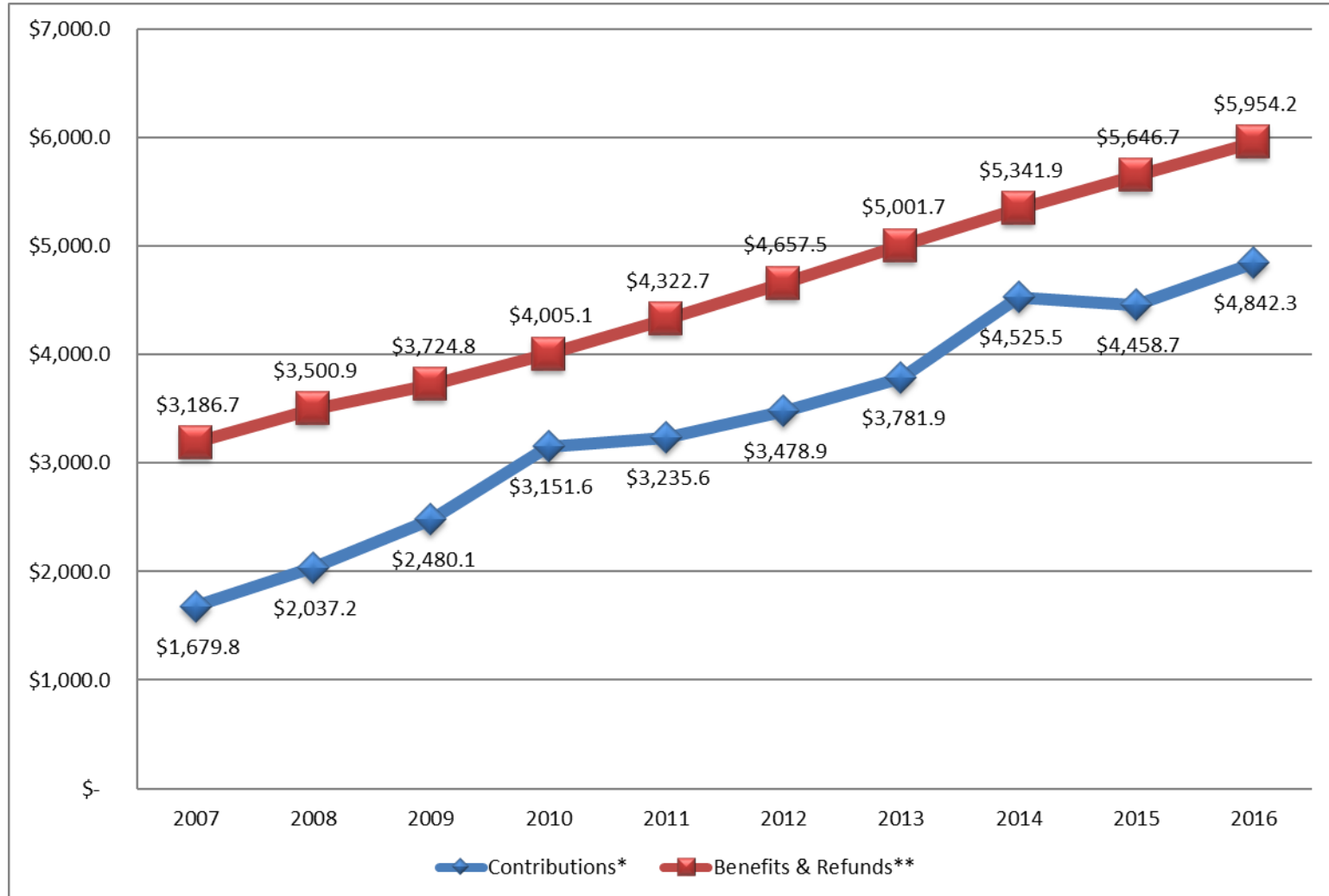


# Asset Returns



# Contributions vs Disbursements

\$ Millions



\* Includes member, employer and state contributions

\*\* Includes benefit payments, refunds and administrative expenses

## Valuation Results – Comments

---

- The actuarial accrued liability increased from \$108.1 billion (as of June 30, 2015) to \$118.6 billion (as of June 30, 2016)
- The unfunded actuarial accrued liability (UAAL) increased from \$62.7 billion to \$71.4 billion
  - Change in economic assumptions increased UAAL by \$5.7 billion
  - Remaining \$3.0 billion increase results from investment and demographic loss (\$1.4 billion) and inadequate State contributions (\$1.6 billion)
- Funded ratio based on the actuarial value of assets decreased from 42.0% to 39.8%
  - 41.8% prior to assumption changes
- Required State contribution for fiscal 2018 is \$4.56 billion, up from \$3.99 billion for fiscal 2017
- State contribution under Actuarial Math 2.0 is \$6.88 billion
  - Statutory contribution is \$2.32 billion less than Board funding policy amount

# Valuation Results

Comparison of current year to prior year (in millions)

	June 30, 2016	June 30, 2015
Actuarial Accrued Liability:		
• Active Members	\$37,681	\$34,888
• Retirees and Beneficiaries	77,688	70,546
• Inactive Members with Deferred Benefits	<u>3,261</u>	<u>2,688</u>
<b>Total</b>	<b>\$118,630</b>	<b>\$108,122</b>
Actuarial Assets	<u>47,222</u>	<u>45,435</u>
Unfunded Accrued Liability	\$71,408	\$62,687
Funded Ratio	39.8%	42.0%

# Valuation Results

---

## Summary of State Contribution for Fiscal Year (in millions)

	FY 2018	FY 2017
Based on Statutory Funding Plan	\$4,565	\$3,987
Based on Actuarial Math 2.0	6,876	6,071
Difference Between Statutory Amount and Actuarial Math 2.0	\$2,311	\$2,084

# Valuation Results

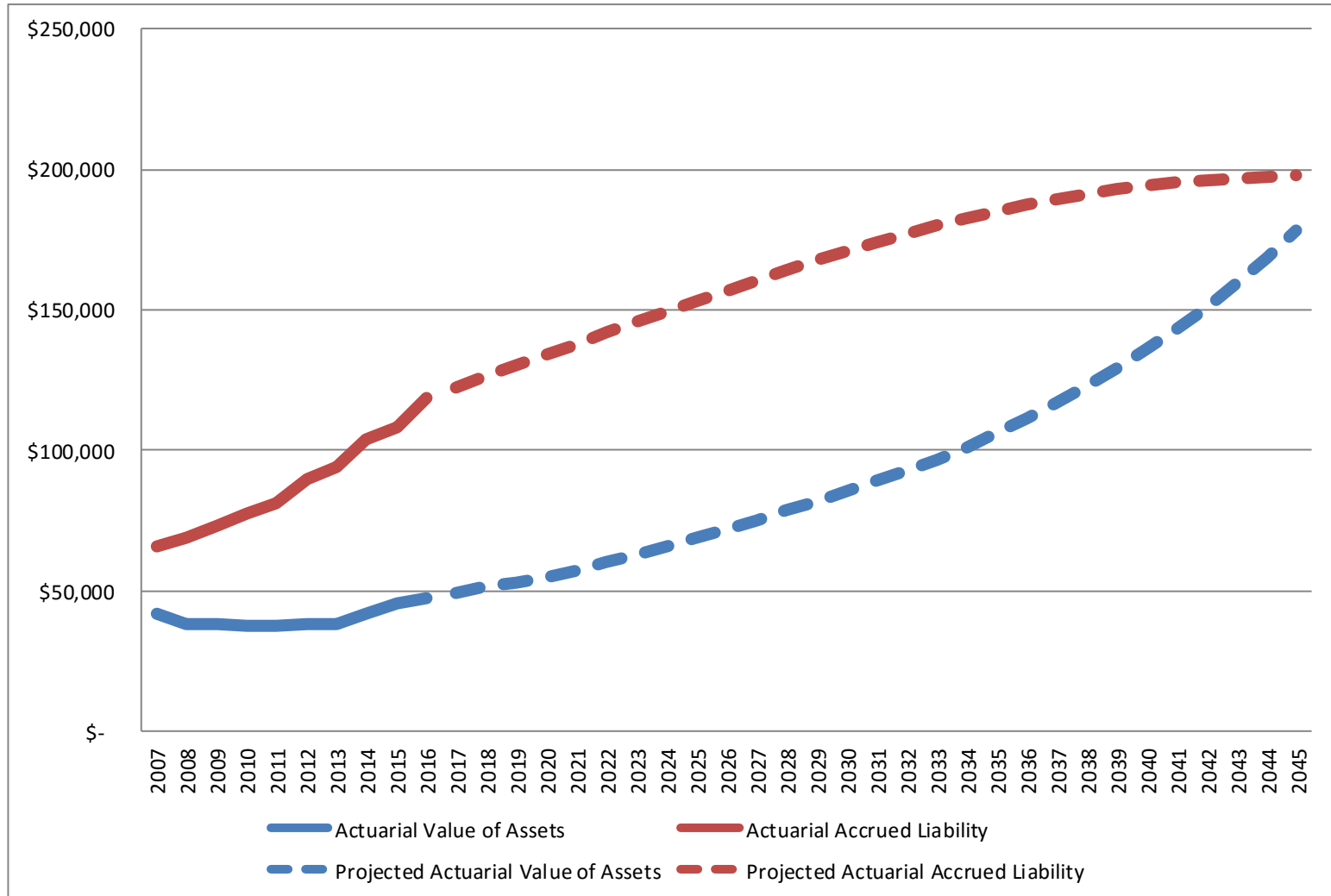
Reconciliation of State Statutory Funding Plan Contribution  
from Fiscal Year 2017 to 2018 (in millions)

	Statutory Funding Contribution
FY 2017 State Contribution	\$3,987
Expected Increase	110
Investment Loss	39
Assumption Changes	402
All Other Net Actuarial Losses	<u>27</u>
FY 2018 State Contribution	\$4,565



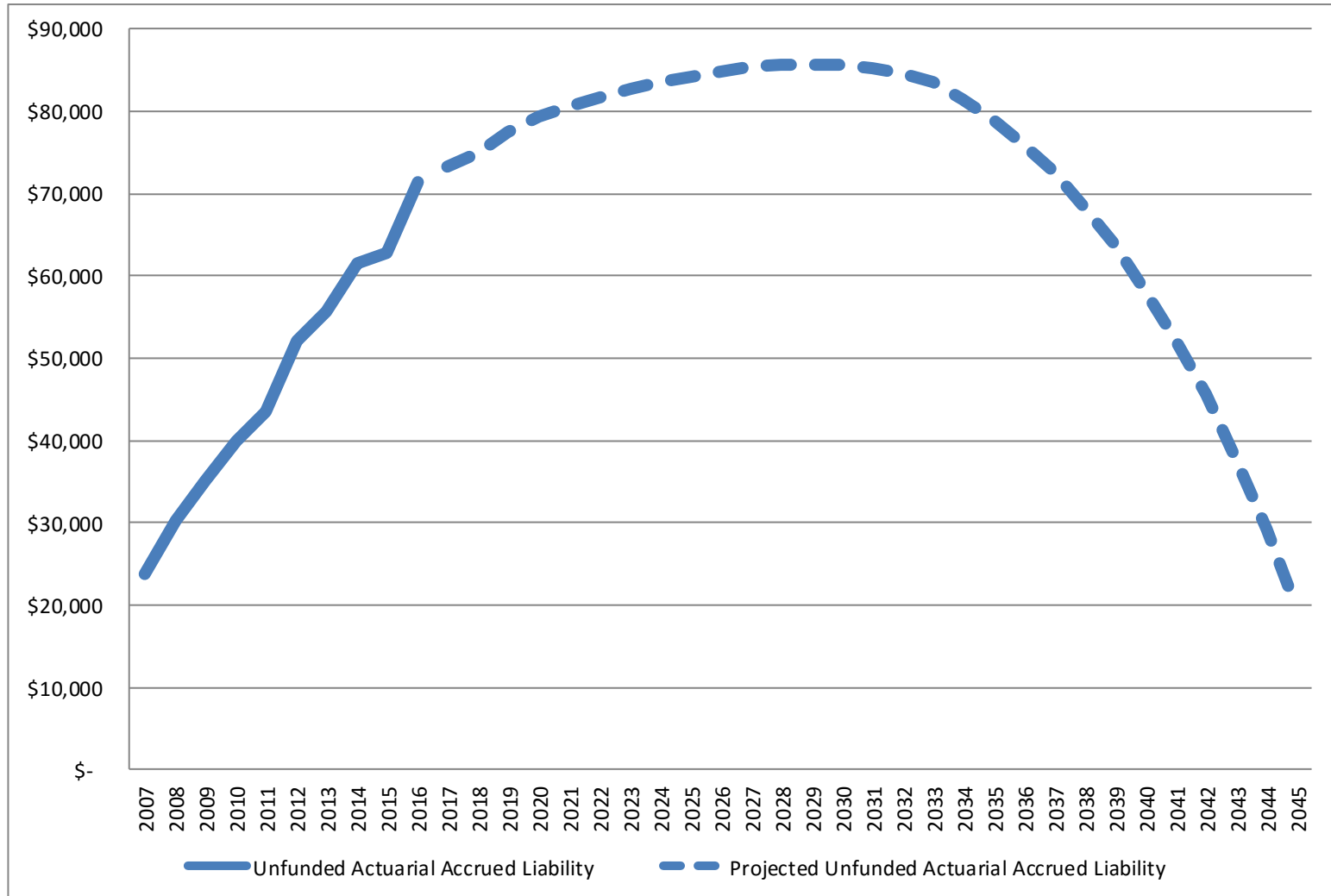
# Assets and Liabilities

\$ Millions

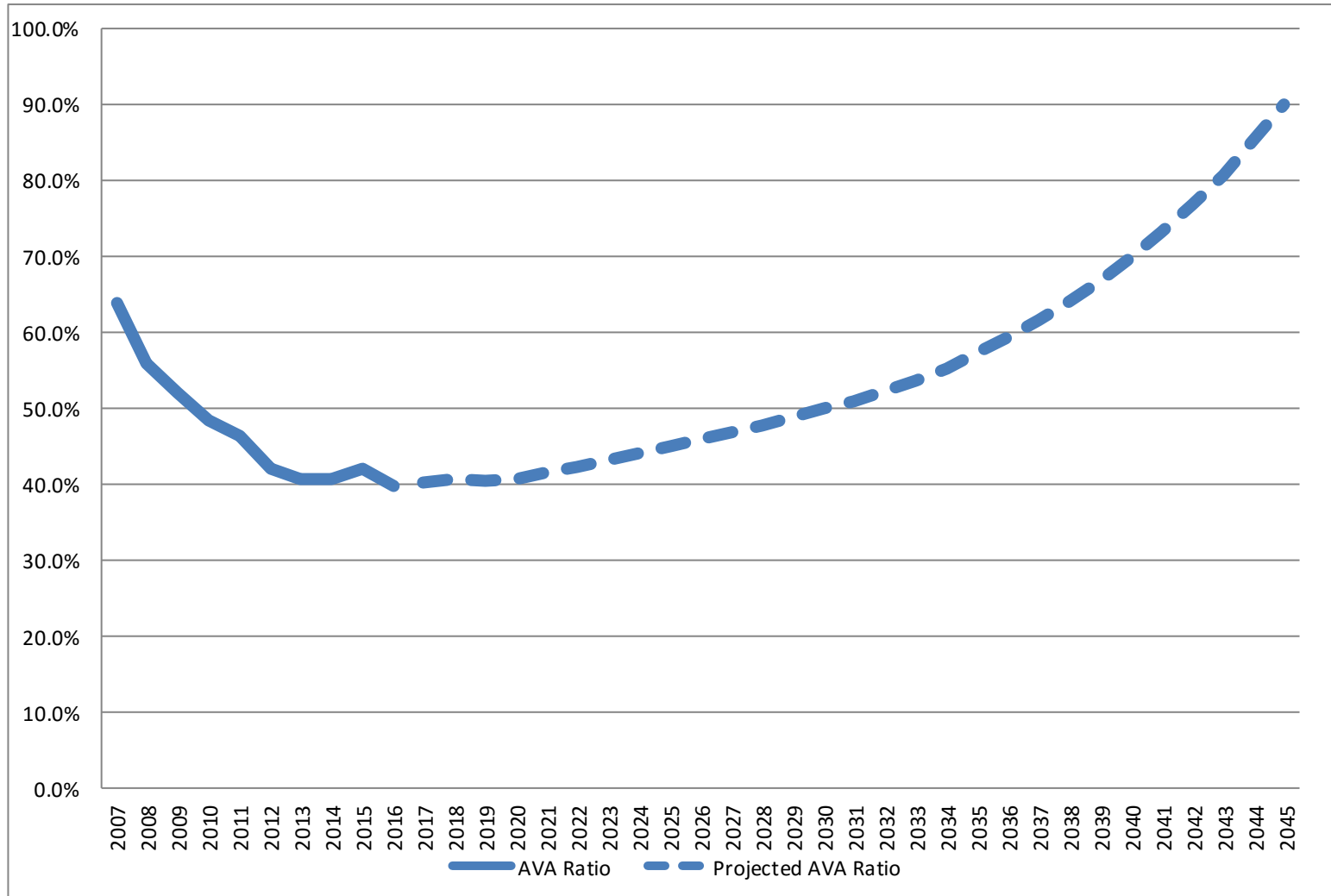


# Unfunded Actuarial Accrued Liability

\$ Millions

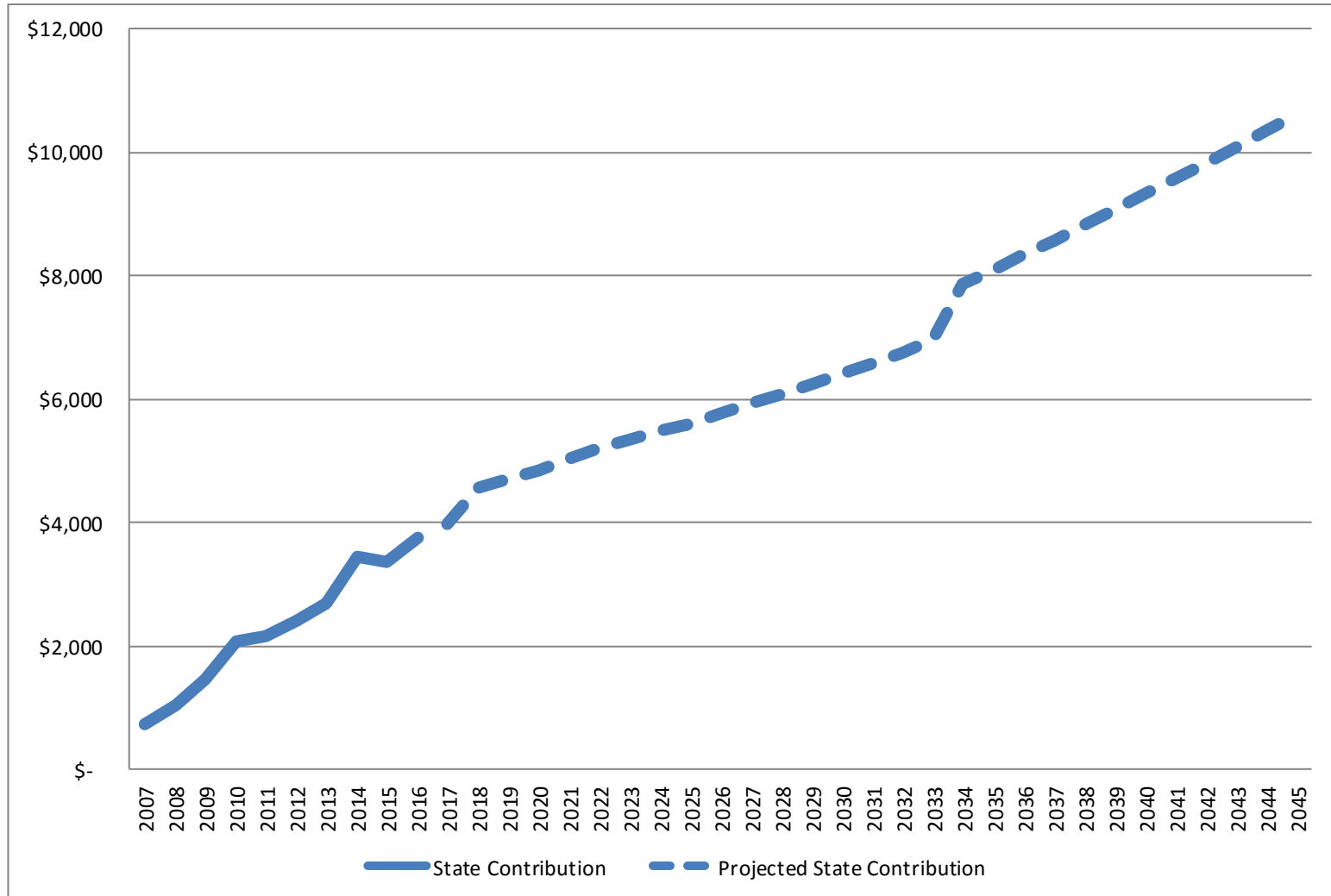


# Funded Ratio



# State Contributions

\$ Millions



# Summary of GASB Accounting Results

GASB Information (\$ in millions)

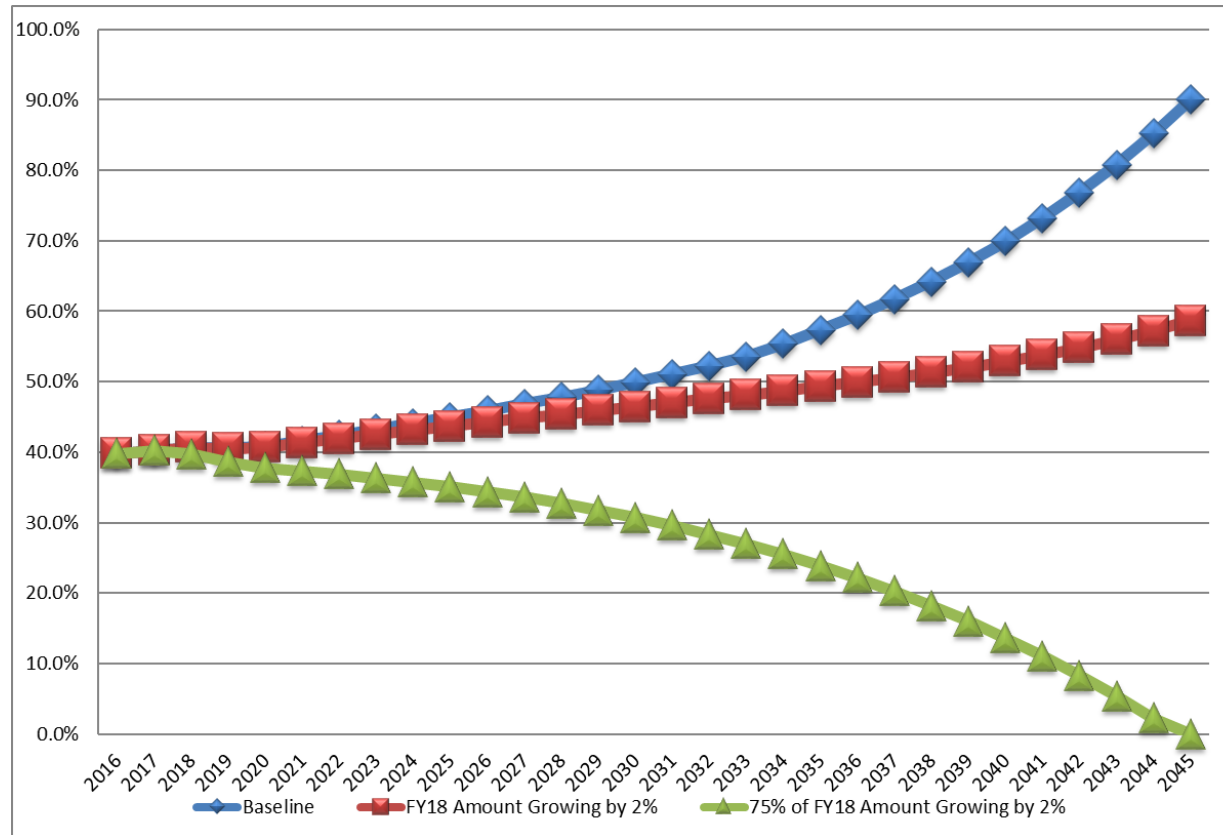
	June 30, 2016	June 30, 2015
Long-term Expected Rate of Return	7.00%	7.50%
Municipal Bond Index	2.85%	3.73%
Single Equivalent Discount Rate	6.83%	7.47%
Total Pension Liability	\$124,187	\$111,917
Plan Fiduciary Net Position	<u>45,251</u>	<u>46,407</u>
Net Pension Liability	\$78,936	\$65,510
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	36.4%	41.5%
Total Pension Expense	\$7,705	\$5,287

# Solvency Projections

---

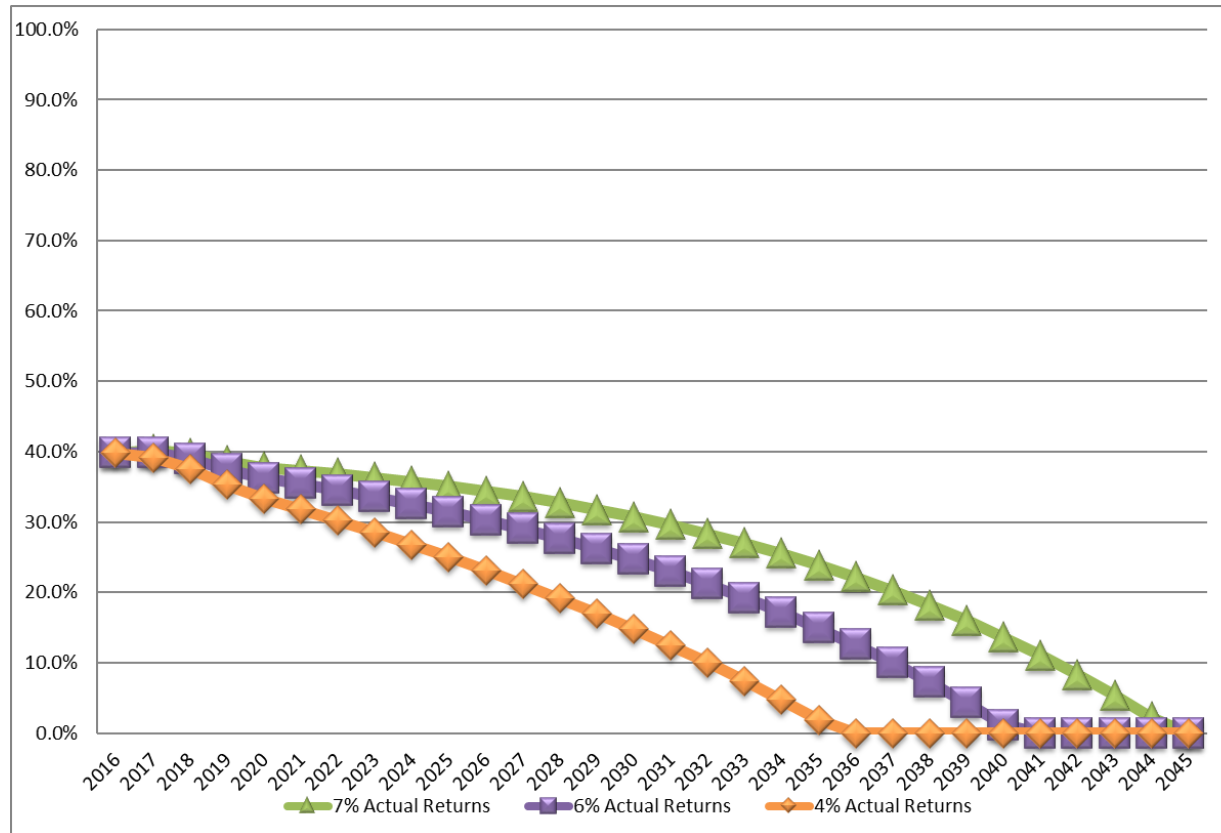
- Included in the determination of the statutorily-required State contribution is an assumption that the annual State contribution will increase by 3.2% per year, on average
- To test the sensitivity of this assumption relative to TRS solvency, we created projections based on the following contribution scenarios:
  - The full FY 2018 amount is contributed, and future contributions increase by 2%
  - 75% of the FY 2018 amount is contributed, and future contributions increase by 2%
- We have also tested the sensitivity of the 7% return assumption by creating projections based on the State contribution scenario of 75% of FY 2018 amount increasing by 2% using the following actual investment returns in each future year:
  - Actual returns of 6% per year
  - Actual returns of 4% per year

# Solvency Projection #1



- If the full FY 2018 State contribution is made, and future contributions increase by 2%, TRS is projected to remain solvent with an increasing funded ratio, but the funded ratio is projected to be less than 60% in 2045
- If 75% of the FY 2018 State contribution is made, and future contributions increase by 2%, TRS is projected to become insolvent in 2045

## Solvency Projection #2



- If 75% of the FY 2018 State contribution is made, future contributions increase by 2%, and actual investment returns are 6% rather than 7%, TRS is projected to become insolvent in 2040 (5 years sooner)
- If 75% of the FY 2018 State contribution is made, future contributions increase by 2%, and actual investment returns are 4% rather than 7%, TRS is projected to become insolvent in 2036 (9 years sooner)



# Appendix

---



**Segal**

- **State Contribution Certification Exhibit A**
- **THIS Fund Certification Exhibit B**

## Exhibit A

Summary of State Contributions under Illinois Pension Code and Actuarial Math 2.0	Fiscal Year 2018
<p><b>1. Based on Statutory Funding Plan</b>  Total State Contribution for fiscal year 2018:</p> <p>a. Benefit Trust Reserve*:</p> <p>    i. 45.19% of membership payroll: \$ 4,717,960,367</p> <p>    ii. Minus School Districts Contribution (0.58% of membership payroll) (60,559,679)</p> <p>    iii. Minus Federal Funds Contribution (0.89% of membership payroll) (93,148,014)</p> <p>    iv. State Contribution \$ 4,564,252,674</p> <p>b. Guaranteed Minimum Annuity Reserve 700,000</p> <p>c. Total State Contribution (current law) \$ 4,564,952,674</p> <p><b>2. Based on Actuarial Math 2.0**</b></p> <p>a. Benefit Trust Reserve*:</p> <p>    i. Normal cost plus amortization \$ 7,076,460,732</p> <p>    ii. Minus School Districts Contribution (0.58% of membership payroll) (60,559,679)</p> <p>    iii. Minus Federal Funds Contribution (1.34% of membership payroll) (140,318,021)</p> <p>    iv. State Contribution \$ 6,875,583,032</p> <p>b. Guaranteed Minimum Annuity Reserve 700,000</p> <p>c. Total State Contribution \$ 6,876,283,032</p> <p><b>3. Total Normal Cost and Employer Normal Cost Rate for Fiscal Year 2018</b></p> <p>a. Total Normal Cost Rate (including administrative expenses): 19.10%</p> <p>b. Member Rate (9.00%)</p> <p>c. Employer Normal Cost Rate 10.10%</p> <p><b>4. Federal Contribution Rate (Same as State Contribution Rate, per PA 98-0674)</b> 44.61%</p>	

\* Expected fiscal year 2018 membership payroll is \$10,441,324,011

\*\* Actuarial Math 2.0 is based on the entry age normal actuarial cost method, current asset valuation method and an amortization policy as follows:

- 20-year closed amortization of Unfunded Actuarial Accrued Liability (UAAL) beginning with Fiscal Year 2017
- Use layered amortization, with new UAAL after Fiscal Year 2017 being amortized over 20 years regardless of source
- Amortization payment increase at the rate of future State revenue growth (assumed to be 2.0%)
- Minimum total contribution is no less than the normal cost in any given year

## Exhibit B

Teacher Health Insurance Security Fund Contribution Amount to be Certified by the Board for Fiscal Year 2018	Fiscal Year 2018
<p><b>Expected State Contribution for Fiscal Year 2018 to THIS Fund:</b></p> <ol style="list-style-type: none"> <li>1. Fiscal Year 2018 membership payroll: <ol style="list-style-type: none"> <li>a. Total: \$ 10,441,324,011</li> <li>b. Minus members who do not contribute to THIS Fund (48,917,190)</li> <li>c. Members who do contribute to THIS Fund \$ 10,392,406,821</li> </ol> </li> <li>2. Member contribution rate (assumed) 1.18%</li> <li>3. Matching State contribution: 1.c. x 2. \$ 122,630,400</li> <li>4. Adjustment to THIS Fund for overestimating fiscal year 2016 member THIS Fund contributions (8,462,687)</li> <li>5. Total THIS Fund State contribution* \$ 114,167,713</li> </ol>	

\* This certification does not include other State contributions to THIS Fund, which are not part of the statutory certification requirement.